

# **INSTALLATION RESTORATION PROGRAM**

**123rd AIRLIFT WING  
KENTUCKY AIR NATIONAL GUARD  
STANDIFORD FIELD  
LOUISVILLE, KENTUCKY**

**FINAL**

**SECOND QUARTERLY MONITORING REPORT  
FOR THE FORMER FIRE TRAINING AREA  
DELIVERABLE 2B**



**19980603 025**

**JANUARY 1998**

**DTIC QUALITY INSPECTED 1**

**DISTRIBUTION STATEMENT A**

**Approved for public release,  
Distribution Unlimited**

# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 074-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATE COVERED	
	Jan 98	final, 3rd Quarter 1996	
4. TITLE AND SUBTITLE <b>Second Quarterly Monitoring Report for the Former Fire Training Area, Deliverable 2B; 123<sup>rd</sup> Airlift Wing, Kentucky Air National Guard, Standiford Field, Louisville, KY</b>		5. FUNDING NUMBERS	
6. AUTHOR(S) <b>Ogden Environmental and Energy Services</b>			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Ogden Environmental and Energy Service      690 Commonwealth Center     11003 Bluegrass Parkway    Louisville, KY 40299</b>		8. PERFORMING ORGANIZATION REPORT NUMBER <b>Ogden Project No. 3-1300-0057-0002</b>	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) <b>ANG/CEVR 3500 Futchet Ave Andrews AFB MD 20762-5157</b>		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT <b>unlimited distribution</b>		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 Words)  <b>The Installation Restoration Program was initiated by the Air National Guard (ANG) to evaluate potential contamination to the environment caused by past practices at its installations. The Preliminary Assessment (PA) identified the location of a former Fire Training Area (FTA). Closure activities in Aug 1995 included placement of a cap. State regulations in this karst area require 30 years of monitoring of the surface water at a nearby spring. This report provides results for the 2nd contracted quarter of the 2<sup>nd</sup> year of monitoring. Samples were collected from Duck Spring on 8 Aug 96 and all analytes were below detection limits. The suite of analytes includes: VOCs, SVOCs, PCBs, dioxin, and TAL metals.</b>			
14. SUBJECT TERMS <b>Installation Restoration Program, Air National Guard, FTA, Standiford Field, Kentucky, long-term monitoring</b>		15. NUMBER OF PAGES <b>27</b>	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT <b>General</b>	18. SECURITY CLASSIFICATION OF THIS PAGE <b>General</b>	19. SECURITY CLASSIFICATION OF ABSTRACT <b>General</b>	20. LIMITATION OF ABSTRACT <b>none</b>

# **INSTALLATION RESTORATION PROGRAM**

**Air National Guard  
Installation Restoration Program  
123rd AIRLIFT WING  
KENTUCKY AIR NATIONAL GUARD  
STANDIFORD FIELD  
LOUISVILLE, KENTUCKY**

**FINAL**

## **SECOND QUARTERLY MONITORING REPORT FOR THE FORMER FIRE TRAINING AREA DELIVERABLE 2B**

Prepared for:

Air National Guard Readiness Center  
Andrews Air Force Base, Maryland

**Ogden Project No. 3-1300-0057-0002**

Prepared by:

Ogden Environmental and Energy Services  
690 Commonwealth Center  
11003 Bluegrass Parkway  
Louisville, Kentucky 40299

**JANUARY 1998**

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1.0 INTRODUCTION/BACKGROUND .....</b>	<b>2</b>
<b>2.0 SITE LOCATION .....</b>	<b>2</b>
<b>3.0 ENVIRONMENTAL SETTING .....</b>	<b>2</b>
3.1 Physiography .....	2
3.2 Population Characteristics .....	5
3.3 Climate .....	5
3.4 Drainage .....	5
3.5 Hydrogeology .....	5
<b>4.0 FIELD PROGRAM .....</b>	<b>6</b>
4.1 Summary of Field Program .....	6
4.1.1 Field Activities .....	6
4.2 Deviations from the Sampling and Analysis Plan .....	7
4.3 Field Screening Activities .....	7
4.4 Analytical Activities .....	7
4.5 Investigation Derived Waste .....	7
<b>5.0 INVESTIGATION FINDINGS .....</b>	<b>7</b>
5.1 Summary of Investigation Findings .....	7
5.1.1 Field Screening Results .....	8
5.1.2 Analytical Results .....	8
<b>6.0 CONCLUSIONS/RECOMMENDATIONS .....</b>	<b>8</b>
<b>7.0 REFERENCES .....</b>	<b>19</b>

## FIGURES

<b>Figure 1: Site Location Map .....</b>	<b>3</b>
<b>Figure 2: FTA Sample Location .....</b>	<b>4</b>

## **TABLES**

<b>Table 1:</b> Summary of Samples Collected .....	<b>6</b>
<b>Table 2:</b> Analytical Results for Metals on the Target Analyte List .....	<b>9</b>
<b>Table 3:</b> Analytical Results for PCBs .....	<b>11</b>
<b>Table 4:</b> Analytical Results for Semi-volatile Organic Compounds .....	<b>12</b>
<b>Table 5:</b> Analytical Results for Volatile Organic Compounds .....	<b>16</b>
<b>Table 6:</b> Analytical Results for Dioxins .....	<b>18</b>

## **APPENDICES**

<b>Field Log Sheets and Chain of Custody .....</b>	<b>Appendix 1</b>
--	-------------------

## **ACRONYMS**

<b>ANG</b>	Air National Guard
<b>ANGRC</b>	Air National Guard Readiness Center
<b>AW</b>	Airlift Wing
<b>CLP</b>	Contract Laboratory Program
<b>CoC</b>	Chain of Custody
<b>EPA</b>	Environmental Protection Agency
<b>FTA</b>	Fire Training Area
<b>IRP</b>	Installation Restoration Program
<b>KYANG</b>	Kentucky Air National Guard
<b>AWQC</b>	Kentucky Water Quality Criteria for Warm Water Aquatic Habitats
<b>HHWQC</b>	Kentucky Water Quality Criteria for Protection of Human Health
<b>MCL</b>	Maximum Contaminant Level
<b>PCB</b>	Polychlorinated biphenyl
<b>QA/QC</b>	Quality Assurance/Quality Control
<b>QC</b>	Quality Control
<b>SOW</b>	Scope of Work
<b>SVOC</b>	Semivolatile Organic Compound
<b>TAL</b>	Target Analyte List
<b>VOC</b>	Volatile Organic Compound

## **EXECUTIVE SUMMARY**

This report documents the analytical results of the second quarterly surface water monitoring program of the second year at the former Fire Training Area (FTA) located at the former 123 Airlift Wing, Kentucky Air National Guard, Standiford Field, Louisville, Kentucky. Field activities were conducted in accordance with the scope of work, provided by the Air National Guard Readiness Center (ANGRC), and the Sampling and Analysis Plan submitted by CH2M HILL Southeast to the ANGRC.

Surface water samples were obtained from the former FTA on 8 August 1996. The analytical results for the second quarterly sampling episode indicated that semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and dioxin levels were below method detection limits in sample FTA-1 and in the duplicate FTA-2. For the target analyte list (TAL), metals found to be above detection limits (calcium, magnesium, and sodium) were not identified by Kentucky Water Quality Criteria for Protection of Human Health (HHWQC), US EPA Maximum Contaminant Levels (MCLs) for drinking water, nor the Kentucky Water Quality Criteria for Warm Water Aquatic Habitats (AWQC). Proper sample handling and analysis was confirmed by Quality Assurance and Quality Control (QA/QC) samples.

## **1.0 INTRODUCTION/BACKGROUND**

The Air National Guard Readiness Center (ANGRC) is responsible for implementation of the Department of Defense Installation Restoration Program (IRP) at all Air National Guard facilities. Through the IRP, sites are identified, evaluated and remediated, if it is determined that past activities threaten public health, public welfare, or the environment. This quarterly monitoring report has been prepared by Ogden Environmental and Energy Services under contract DAHA90-94-D-0005 with the ANGRC.

This document presents the second quarterly monitoring activities and results for the second year of the postclosure monitoring at the former FTA at the former 123rd Airlift Wing (123 AW), Kentucky Air National Guard (KYANG), Standiford Field, Louisville, Kentucky (base). The location of the former base is shown on Figure 1. The quarterly monitoring is being conducted as part of the ANG IRP.

The purpose of this report is to describe field sampling activities and the analytical results generated from those activities. The objective of the quarterly monitoring program is to monitor the effectiveness of the closure action by comparing analytical results against the criteria specified in the approved Sampling and Analysis Plan and scope of work.

## **2.0 SITE LOCATION**

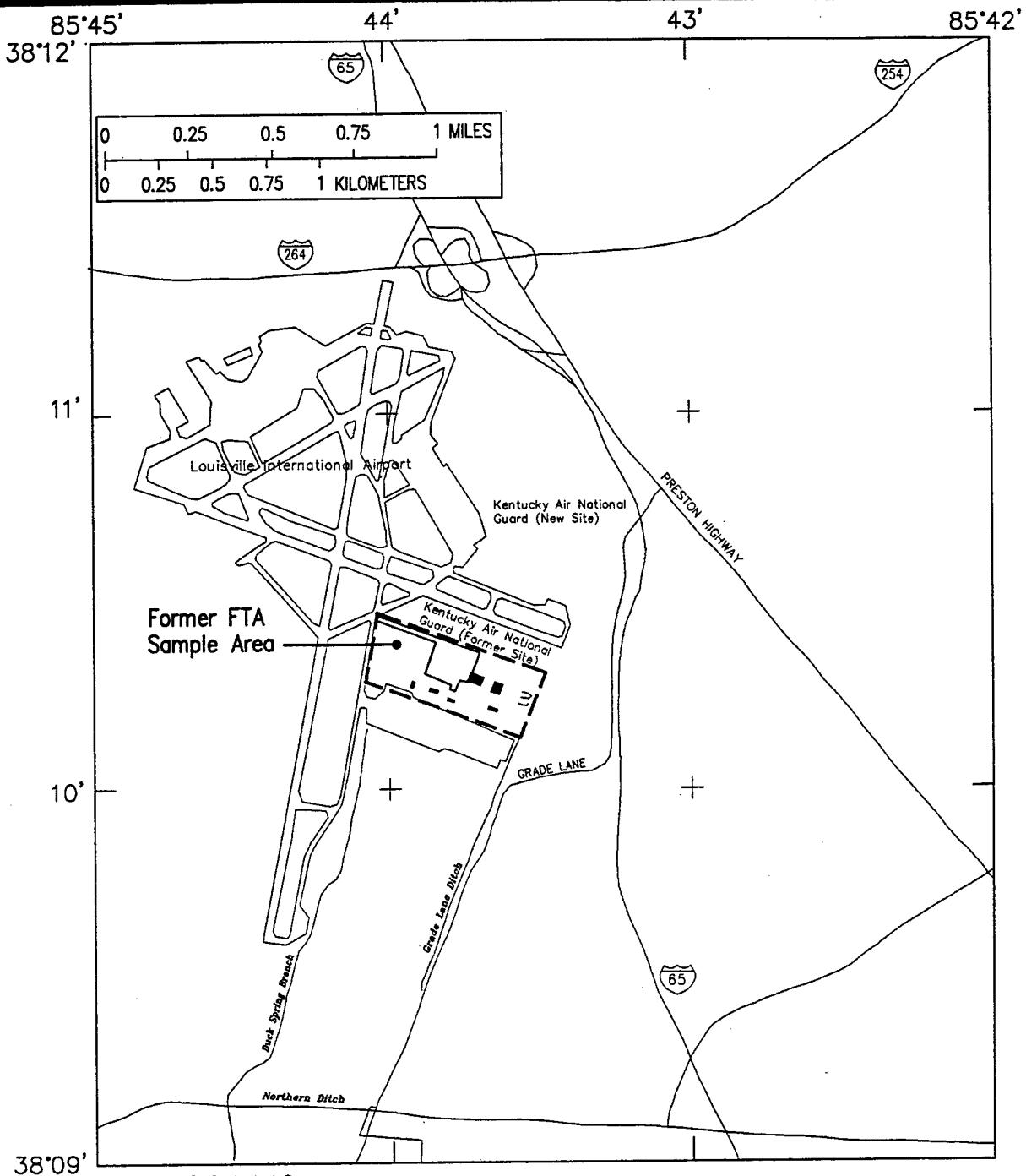
The former base is located on the eastern side of Standiford Field, approximately 5.5 miles southeast of downtown Louisville. The former FTA, where closure monitoring is taking place, is located in the western area of the site as shown in Figure 2. Physical features of the site include Duck Springs, Duck Springs Branch flowing south from Duck Springs, and drainage ditches to the east, west, and south of the former FTA.

## **3.0 ENVIRONMENTAL SETTING**

The environmental setting of the former base is described in detail in the IRP Site Investigation Report (U.S. Geological Survey, 1993). Summaries of the physiography, population characteristics, climate, drainage, and hydrogeology are presented below.

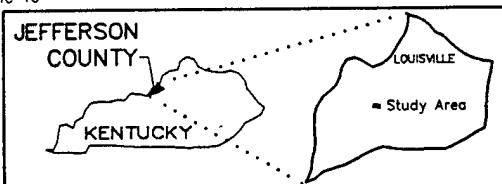
### **3.1 Physiography**

The site is near the geographic center of Jefferson County, Kentucky (Figure 1). The county borders the Ohio River and lies mainly in the Bluegrass physiographic section of Kentucky (Lobeck, 1932). Most of the county has a gently rolling topography with low relief, except near major drainage areas. The flood plain of the Ohio River is about 6 miles northwest of the base. Elevations of the flood plain are typically 430 to 440 feet above sea level. The normal lower pool elevation of the Ohio River is 383 feet above sea level. The elevation of the former engine test pad is 472 feet above sea level. The former engine test pad was located on top of a portion of the former FTA.



Base from U.S. Geological Survey  
Digital data, 800,000, 1983  
Universal Transverse Mercator, Zone 16

Former Kentucky Air National Guard Base Boundary



Modified from IRP SI Report at the 123rd Airlift Wing,  
Kentucky Air National Guard, Louisville International  
Airport, Louisville, Kentucky, March 1993

Drawn By: LCK Checked By: KRM Date: 3/24/97



690 Commonwealth Center  
11003 Bluegrass Parkway  
Louisville, Kentucky 40299  
(502) 267-0700

123rd Airlift Wing  
Kentucky Air National Guard  
Louisville International Airport  
Louisville, Kentucky

SITE  
LOCATION  
MAP

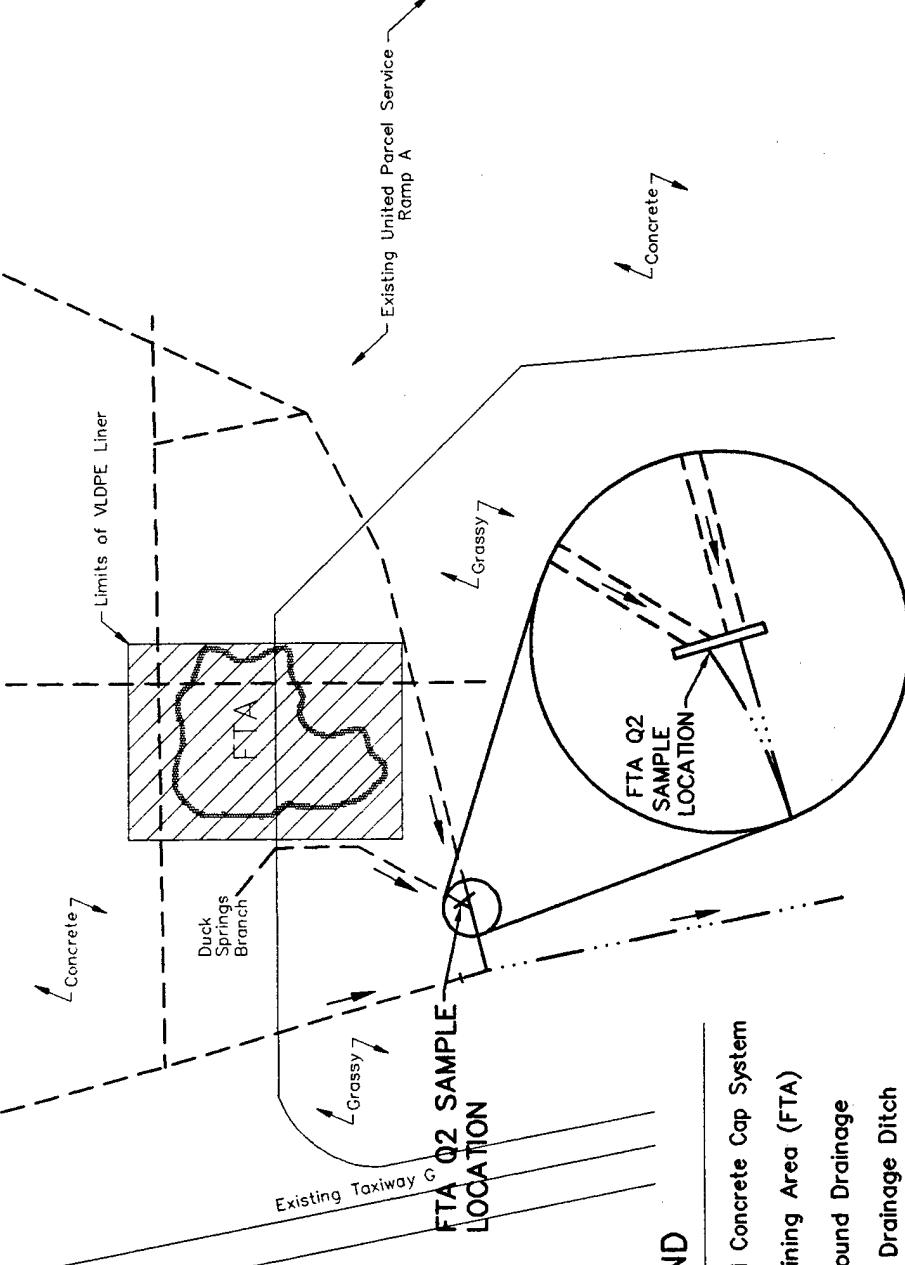
Figure  
1



NOT TO SCALE

Connects to  
Existing Drainage

### Louisville International Airport



### LEGEND

- Proposed Concrete Cap System
- Fire Training Area (FTA)
- Underground Drainage
- Surface Drainage Ditch
- Flow Direction

Modified from IRP Sampling and Analysis Plan for  
the Fire Training Area. November 1994

Drawn By: KR Checked By: KR Date: 10/14/96

**OGDEN**  
INTERNATIONAL

123rd Airlift Wing  
Kentucky Air National Guard  
Louisville International Airport  
Louisville, Kentucky

FTA SAMPLE LOCATION

Figure 2

### **3.2 Population Characteristics**

Residential areas are located immediately east of Standiford Field across Interstate 65. Commercial and industrial areas are located south and west of the airport and site.

### **3.3 Climate**

The climate of Kentucky is classified as moist-continental. Winters are moderately cold (temperatures rarely below 0 °F), and summers are moderately hot (temperatures rarely above 100 °F). The coldest months are January and February, during which daily minimum temperatures average 25 °F; the warmest months are July and August, during which daily maximum temperatures average 87 °F (U.S. National Oceanic and Atmospheric Administration, 1993). The average annual precipitation at Louisville is 43.03 inches. Generally, October is the driest month, with March being the wettest.

### **3.4 Drainage**

Surface runoff from the former FTA flows into Duck Springs Branch. Duck Springs Branch flows to the southwest for about 1.8 miles, where it joins Northern Ditch, approximately 0.5 miles west of the confluence of Grade Lane Ditch and Northern Ditch. All surface runoff from the base eventually flows into the Ohio River.

### **3.5 Hydrogeology**

The natural soil cover and unconsolidated deposits are not considered to be a source of water because of their high clay content. The water table in the unconsolidated deposits is within a few feet of the land surface for most of the year because of the relatively low permeability of the unconsolidated material and the underlying shale. Because of the long history of land reclamation, land use, and airport and base construction at the former FTA, the presence of natural soil profiles is uncertain.

The main aquifer beneath the former base is bedrock made up of the Jeffersonville and Sellersburg Limestones. This bedrock produces water mainly through fractures that have been enlarged by dissolution of the limestone. Precipitation enters the fracture system in the outcrop areas and flows generally toward the Ohio River. Ground water in the fracture system is confined or semiconfined by overlying shale. Wells that do not intersect fractures produce little or no water. The New Albany Shale is the first consolidated geologic layer encountered in the area of the former FTA. Based on the soil boring logs contained in the March 1993 Site Investigation proposed by the United States Geological Survey, the shale is predominantly located in or near the southern portion of the former FTA.

## 4.0 FIELD PROGRAM

### 4.1 Summary of Field Program

As a closure method under Kentucky Statute KRS 224.46-520, a cap has been placed over the former FTA as of August 1995. As part of the closure activities at the former FTA, Kentucky Statute KRS 224.46-520 requires postclosure monitoring and maintenance for a minimum of thirty years after closure. Surface water monitoring will be conducted at the discharge of Duck Spring throughout the 30-year postclosure period. Surface water samples will be collected and analyzed quarterly. If eight consecutive quarterly samples are below detection limits, or in the case of inorganics, below ambient human health and aquatic criteria, a variance recommending a less frequent sampling period will be requested.

#### 4.1.1 Field Activities

On 8 August 1996 one sample was collected from the drainage culvert as required by the Sampling and Analysis Plan (Figure 2). A duplicate sample and matrix spike/matrix spike duplicate samples were also collected. The original sample and the duplicate sample were labeled with the identification numbers of FTA-1 and FTA-2, respectively. The matrix spike/matrix spike duplicate samples were labeled MS and MSD respectively for laboratory identification. A trip blank sample accompanied the samples during shipment and was analyzed for VOCs utilizing methods 8010 and 8020. Table 1 summarizes the samples collected and analyses performed. Sampling activities were recorded in the project log book, a copy of which is provided in Appendix I. The sample identification numbers, time of collection and associated analytical methods were recorded on the Chain of Custody (CoC).

Table 1. Summary of Surface Water Samples Collected

Samples Collected	Parameters				
	VOCs	SVOCs	TAL Metals	Dioxins	PCBs
FTA - 1	X	X	X	X	X
FTA - 2*	X	X	X	X	X
FTA - 1MS	X	X	X	X	X
FTA - 1MSD	X	X	X	X	X
Tripblank	X				

\*FTA-2 is a duplicate sample of FTA-1

MS: Matrix Spike (Extra sample water required to perform SVOC, Dioxin, and PCB analysis)  
MSD: Matrix Spike Duplicate (Extra sample water required to perform SVOC, Dioxin, and PCB analysis)

## **4.2 Deviations from the Sampling and Analysis Plan**

There were no deviations from the Sampling and Analysis Plan.

## **4.3 Field Screening Activities**

There are no field screening activities identified in the Scope of Work or in the Sampling and Analysis Plan.

## **4.4 Analytical Activities**

Samples were collected and analyzed, utilizing Environmental Protection Agency (EPA) quality control (QC) level III reportables, for the parameters specified in the Sampling and Analysis Plan.

- Semivolatile Organic Compounds (SVOCs) utilizing EPA method 8270;
- Volatile Organic Compounds (VOCs) utilizing EPA methods 8010 and 8020;
- Metal Target Analyte List (TAL) analysis following Contract Laboratory Program (CLP);
- Dioxins utilizing EPA method 8280; and
- Polychlorinated biphenyls (PCBs) utilizing EPA method 8080.

Level III reportables provide sufficient information to conduct a data validation, thereby permitting the data to be used in remedial actions if required. Samples were collected in laboratory supplied containers. Preservatives, as necessary, were added to containers in the laboratory prior to container shipment. Data validation was completed on these samples by the laboratory as requested.

## **4.5 Investigation Derived Waste**

No waste was generated during field sampling activities.

# **5.0 INVESTIGATION FINDINGS**

## **5.1 Summary of Investigation Findings**

In accordance with the scope of work, the organic analyses (VOCs, SVOCs, PCBs, and dioxins) results were compared to method detection limits. The analytical results for the second quarterly monitoring episode of the second year indicated that VOCs, SVOCs, PCBs, and dioxins levels were below their associated method detection limits. Analytical results for TAL metals above detection limits included calcium, magnesium, and sodium. TAL metal results were compared to HHWQC, AWQC, and MCLs and those TAL metals found above detection limits were not identified on these lists. The sample results from the second quarter were similar to the first quarter results of the

current delivery order (0057). However, toluene, a VOC which was detected through the laboratory analysis of the first quarter sample, was not detected in the second quarter sample.

### **5.1.1 Field Screening Results**

There are no field screening activities identified in the Scope of Work (SOW) or in the Sampling and Analysis Plan.

### **5.1.2 Analytical Results**

Metal analytical results from the surface water samples indicated calcium, magnesium, and sodium levels to be above method detection limits (Table 2). Calcium, magnesium, and sodium were not identified on any of the specified criteria lists. Analytical results for VOCs, SVOCs, PCBs, and dioxins were all below method detection limits. Tables 3, 4, 5, and 6 are summary tables for SVOCs, PCBs, VOCs, and dioxins results, respectively. Proper sample handling and analysis was confirmed by QA/QC samples. At the request of the ANGRC, analytical laboratory data sheets are not submitted with this monitoring report. The analytical data sheets with associated quality control data are on file. A copy of the laboratory data sheets will be submitted upon request.

## **6.0 CONCLUSIONS/RECOMMENDATIONS**

No VOCs, SVOCs, PCBs, or dioxins were detected above method detection limits in the discharge water of Duck Springs. Metal analytical results identified calcium, magnesium, and sodium to be above their method detection limits. Of the metals found to be above method detection limits, calcium, magnesium, and sodium were not identified by the HHWQC, the MCLs list, or the AWQC.

According to the analytical results, the former FTA has not adversely affected Duck Springs. Quarterly sampling and analysis will continue. If eight consecutive quarterly surface water samples are below method detection limits or, in the case of inorganics, below ambient human health and aquatic criteria a variance recommending a less frequent sampling period will be requested. To date, six (6) sampling events have been completed.

**TABLE 2. ANALYTICAL RESULTS FOR METALS ON THE TARGET ANALYTE LIST**

PARAMETER	RESULT (ug/l)	DETECTION LIMIT (ug/l)	KY WATER QUALITY CRITERIA FOR PROTECTION OF HUMAN HEALTH (ug/l)	MCL (ug/l)	KY WARM WATER AQUATIC HABITAT CRITERIA (ug/l) **	ACUTE	CHRONIC
	FRA-1	FRA-2					
Silver	ND	ND	10	N/I	100	38.79	N/E
Aluminum	ND	ND	200	N/I	50 - 200	N/I	N/I
Arsenic	ND	ND	10	N/I	50	N/E	50
Barium	ND	ND	200	N/I	2000	N/I	N/I
Beryllium	ND	ND	5	0.117	4	N/I	N/I
Calcium	137000	136000	5000	N/I	N/I	N/I	N/I
Cadmium	ND	ND	5	N/I	5	17.23	3.17
Cobalt	ND	ND	5	N/I	N/I	N/I	N/I
Chromium	ND	ND	10	670000	100	16	11
Copper	ND	ND	25	N/I	1300 *	61	36.3
Iron	ND	ND	100	N/I	300	4000	1000
Mercury	ND	ND	0.2	0.146	2	2.4	0.012
Potassium	ND	ND	5000	N/I	N/I	N/I	N/I

**TABLE 2. ANALYTICAL RESULTS FOR METALS ON THE TARGET ANALYTE LIST (continued)**

PARAMETER	RESULT ( $\mu\text{g/l}$ )		DETECTION LIMIT ( $\mu\text{g/l}$ )	KY WATER QUALITY CRITERIA FOR PROTECTION OF HUMAN HEALTH ( $\mu\text{g/l}$ )	MCL ( $\mu\text{g/l}$ )	KY WARM WATER HABITAT CRITERIA ( $\mu\text{g/l}$ )**	
	FTA-1	FTA-2				ACUTE	CHRONIC
Magnesium	15100	14900	5000	N/I	N/I	N/I	N/I
Manganese	ND	ND	15	N/I	50	N/I	N/I
Sodium	79200	78800	5000	N/I	N/E	N/I	N/I
Nickel	ND	ND	40	N/I	100	4304.6	478.5
Lead	ND	ND	3	N/I	15 *	434	16.9
Antimony	ND	ND	60	45000	6	N/I	N/I
Selenium	ND	ND	5	N/I	50	20	5
Thallium	ND	ND	10	48	2	N/I	N/I
Vanadium	ND	ND	50	N/I	N/E	N/I	N/I
Zinc	ND	ND	20	N/I	N/E	355.78	322

\* Action Level, No MCL established  
\*\* Calculated only for inorganics

N/I Not Included within criteria  
N/E Not Established

**TABLE 3. ANALYTICAL RESULTS FOR PCBs (8080)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
Aroclor - 1016	ug/l	ND	ND	1
Aroclor - 1221	ug/l	ND	ND	2
Aroclor - 1232	ug/l	ND	ND	2
Aroclor - 1242	ug/l	ND	ND	1
Aroclor - 1248	ug/l	ND	ND	1
Aroclor - 1254	ug/l	ND	ND	0.5
Aroclor - 1260	ug/l	ND	ND	0.5

**TABLE 4. ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS  
(SVOC 8270)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
4-Chloro-3-methylphenol	ug/l	ND	ND	10
2-Chlorophenol	ug/l	ND	ND	10
2,4-Dichlorophenol	ug/l	ND	ND	10
2,4-Dimethylphenol	ug/l	ND	ND	10
4,6-Dinitro-2-Methylphenol	ug/l	ND	ND	50
2,4-Dinitrophenol	ug/l	ND	ND	50
2-Methylphenol	ug/l	ND	ND	10
4-Methylphenol	ug/l	ND	ND	10
2-Nitrophenol	ug/l	ND	ND	10
4-Nitrophenol	ug/l	ND	ND	50
Pentachlorophenol	ug/l	ND	ND	50
Phenol	ug/l	ND	ND	10
2,4,5-Trichlorophenol	ug/l	ND	ND	50
2,4,6-Trichlorophenol	ug/l	ND	ND	10
Acenaphthene	ug/l	ND	ND	10

**TABLE 4. ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS  
(SVOC 8270) (continued)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
Acenaphthylene	ug/l	ND	ND	10
Anthracene	ug/l	ND	ND	10
Benzo (A) Anthracene	ug/l	ND	ND	10
Benzo (A) Pyrene	ug/l	ND	ND	10
Benzo (B) Fluoranthene	ug/l	ND	ND	10
Benzo (G,H,I) Perylene	ug/l	ND	ND	10
Benzo (K) Fluoranthene	ug/l	ND	ND	10
Bis (2-Chloroethoxy) Methane	ug/l	ND	ND	10
Bis (2-Chloroethyl) Ether	ug/l	ND	ND	10
Bis (2-Chloroisopropyl) Ether	ug/l	ND	ND	10
Bis (2-Ethylhexyl) Phthalate	ug/l	ND	ND	10
4-Bromophenyl Phenyl Ether	ug/l	ND	ND	10
Butylbenzyl Phthalate	ug/l	ND	ND	10
Carbazole	ug/l	ND	ND	10
4-Chloroaniline	ug/l	ND	ND	50

**TABLE 4. ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS  
(SVOC 8270) (continued)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
2-Chloronaphthalene	ug/l	ND	ND	10
4-Chlorophenyl Phenyl Ether	ug/l	ND	ND	10
Chrysene	ug/l	ND	ND	10
Dibenzo (A,H) Anthracene	ug/l	ND	ND	10
Dibenzofuran	ug/l	ND	ND	10
3,3'-Dichlorobenzidine	ug/l	ND	ND	10
Diethylphthalate	ug/l	ND	ND	10
Dimethylphthalate	ug/l	ND	ND	10
Di-N-Butylphthalate	ug/l	ND	ND	10
2,4-Dinitrotoluene	ug/l	ND	ND	10
2,6-Dinitrotoluene	ug/l	ND	ND	10
Di-N-Octylphthalate	ug/l	ND	ND	10
Fluoranthene	ug/l	ND	ND	10
Fluorene	ug/l	ND	ND	10
Hexachlorobenzene	ug/l	ND	ND	10
Hexachlorobutadiene	ug/l	ND	ND	10

**TABLE 4. ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS  
(SVOC 8270) (continued)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
Hexachlorocyclopentadiene	ug/l	ND	ND	10
Hexachloroethane	ug/l	ND	ND	10
Indeno (1,2,3-CD) Pyrene	ug/l	ND	ND	10
Isophorone	ug/l	ND	ND	10
2-Methylnaphthalene	ug/l	ND	ND	10
Naphthalene	ug/l	ND	ND	10
2-Nitroaniline	ug/l	ND	ND	10
3-Nitroaniline	ug/l	ND	ND	25
4-Nitroaniline	ug/l	ND	ND	25
Nitrobenzene	ug/l	ND	ND	10
N-Nitrosodiphenylamine	ug/l	ND	ND	10
N-Nitroso-Di-N-Propylamine	ug/l	ND	ND	10
Phenanthrene	ug/l	ND	ND	10
Pyrene	ug/l	ND	ND	10
1,2,4 Trichlorobenzene	ug/l	ND	ND	10

**TABLE 5. ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS  
(VOCs 8010 & 8020)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
Benzene	ug/l	ND	ND	1
Bromodichloromethane	ug/l	ND	ND	1
Bromoform	ug/l	ND	ND	1
Bromomethane	ug/l	ND	ND	1
Carbon Tetrachloride	ug/l	ND	ND	1
Chlorobenzene	ug/l	ND	ND	1
Chloroethane	ug/l	ND	ND	1
Chloroform	ug/l	ND	ND	1
Chloromethane	ug/l	ND	ND	1
Dibromochloromethane	ug/l	ND	ND	1
1,2-Dichlorobenzene	ug/l	ND	ND	2
1,3-Dichlorobenzene	ug/l	ND	ND	2
1,4-Dichlorobenzene	ug/l	ND	ND	2
1,1-Dichloroethane	ug/l	ND	ND	1
1,2-Dichloroethane	ug/l	ND	ND	1
1,1-Dichloroethene	ug/l	ND	ND	1

**TABLE 5. ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS  
(VOCS 8010 & 8020) (continued)**

PARAMETER	UNITS	RESULT		REPORTING LIMIT
		FTA-1	FTA-2	
Trans 1,2 Dichloroethene	ug/l	ND	ND	5
1,2-Dichloropropane	ug/l	ND	ND	1
CIS-1,3-Dichloropropene	ug/l	ND	ND	1
Trans-1,3-Dichloropropene	ug/l	ND	ND	1
Ethylbenzene	ug/l	ND	ND	1
Methylene Chloride	ug/l	ND	ND	1
Methyl T-Butyl Ether	ug/l	ND	ND	1
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	1
Tetrachloroethene	ug/l	ND	ND	1
Toluene	ug/l	ND	ND	1
1,1,1-Trichloroethane	ug/l	ND	ND	1
1,1,2-Trichloroethane	ug/l	ND	ND	1
Trichloroethene	ug/l	ND	ND	1
Trichlorofluoromethane	ug/l	ND	ND	1
Vinyl Chloride	ug/l	ND	ND	1
Xylenes (Total)	ug/l	ND	ND	1

**TABLE 6. ANALYTICAL RESULTS FOR DIOXINS (8280)**

Parameter	Result (ppm*)		Detection Limit	
	FIA-1	FIA-2	FIA-1	FIA-2
2,3,7,8-TCDD	ND	ND	0.62	0.588
1,2,3,7,8-PeCDD	ND	ND	3.9	3.7
1,2,3,4,7,8-HxCDD	ND	ND	4.5	4.27
1,2,3,6,7,8-HxCDD	ND	ND	2.8	2.65
1,2,3,7,8,9-HxCDD	ND	ND	11.4	10.8
1,2,3,4,6,7,8-HpCDD	ND	ND	4	3.79
1,2,3,4,6,7,8,9-OCDD	ND	ND	4.8	4.55
2,3,7,8-TCDF	ND	ND	0.54	0.512
1,2,3,7,8-PeCDF	ND	ND	5.9	5.59
2,3,4,7,8-PeCDF	ND	ND	7	6.64
1,2,3,4,7,8-HxCDF	ND	ND	7.5	7.11
1,2,3,6,7,8-HxCDF	ND	ND	7.6	7.2
2,3,4,6,7,8-HxCDF	ND	ND	6.4	6.07
1,2,3,7,8,9-HxCDF	ND	ND	6.5	6.16
1,2,3,4,6,7,8-HpCDF	ND	ND	2.4	2.27
1,2,3,4,7,8,9-HpCDF	ND	ND	5.1	4.83
1,2,3,4,6,7,8,9-OCDF	ND	ND	4.9	4.64

\* parts per trillion

## 7.0 REFERENCES

CH2M Hill, November 1994, Final Sampling and Analysis Plan for the Fire Training Area.  
Oak Ridge, Tennessee.

Lobeck, A.K., 1932 Physiographic Diagram of Kentucky, Atlas of American Geology, Geographical Press, Columbia University.

National Oceanic and Atmospheric Administration, 1993, Local Climatological Data, Annual Summary with Comparative Data, Louisville, Kentucky. Ashville, North Carolina.

State of Kentucky Natural Resources and Environmental Protection Cabinet, Department for Environmental Protection, Division of Water, 401 KAR 5:031 Surface Water Standards, Section 2 and Section 4.

U.S. Geological Survey, 1974, Geological Map of the Louisville East Quadrangle, Jefferson County, Kentucky, by Roy C. Kepferle. Reston, Virginia.

U.S. Geological Survey, March 1993, Site Investigation at the 123rd Airlift Wing, Kentucky Air National Guard, Standiford Field, Louisville, Kentucky. Louisville, Kentucky.

U.S. EPA, November 1994, Drinking Water Regulations and Health Advisories.

**FIELD LOG SHEETS  
&  
CHAIN OF CUSTODY**

**APPENDIX 1**

(12)

1996 Q2 Sampling Event, D.O #57

PennDinger onto Bladue  
on site at 9:12 am  
for Oden'

met Phil at his office  
Drove Phil to UPS feeder

gate, where we met Ann Jackson  
from UPS to oversee our

activities on UPS property. Ann  
Drove us to sample collection point.

Flow appeared clear and

strong; has been over 1 week  
since last significant rainfall

event. Sampling conducted - water  
collected directly into sample bottles,

as has been done previously. Discussion  
about providing UPS with sampling  
results takes place between Ann & Phil.

(13)

Staff gauge 6.

FTA-1 dusting  
FTA-2 dioxins

MIS dioxins  
MSD dioxins

FTA-1 PCB  
FTA-2 PCB

MS - PCB

MSD - PCB

FTA-1 PCB

FTA-2 PCB

MIS - PCB

MSD - PCB

